

# Caterpillar Mushroom, *Ophiocordyceps sinensis* (Ascomycetes): A Potential Bioresource for Commercialization in Sikkim Himalaya, India

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**ABSTRACT:** *Ophiocordyceps sinensis* has a long history of use in Tibetan traditional medicine and traditional Chinese medicine as a powerful tonic and aphrodisiac. The species is inextricably linked to the trade of medicinal and aromatic plants in East Asia. Its demand has increased substantially in the international market, and its collection and trade have significantly improved the socioeconomic status of the people in some regions. Nonetheless, in Sikkim this resource is still untapped formally, but it is traded illegally. Formal legalization and the community's involvement will ensure the conservation and sustainability of the species, as well as proper management of harvesting areas and monitoring of pressure on Yartsa Gunbu to exploit it.

**KEY WORDS:** bioresource, commercialization, medicinal mushrooms and fungi, *Ophiocordyceps sinensis*, Sikkim Himalaya, traditional medicine, Yartsa Gunbu

**ABBREVIATIONS:** EDC, ecodevelopment committee; FEWMD, Forests, Environment and Wildlife Management Department; JFMC, joint forest management committee

## I. INTRODUCTION

Mushrooms have long been used as a food source and dietary supplement and are proven to have medicinal properties. They are known to reduce the side effects of chemotherapy and to help fight cancer (<http://www.medicinalmushroominfo.com>; accessed 2015 Nov 3). The Chinese and the Egyptians were the first to recognize the value of mushrooms, but their consumption has become popular in other East Asian nations and in Western countries.

The current market value of medicinal mushrooms and their dietary supplements is over US\$20.0 billion/year.<sup>1-3</sup> The Chinese caterpillar mushroom, *Ophiocordyceps sinensis* (Berk.) G.H. Sung et al. (syn. *Cordyceps sinensis*, Ophiocordycipitaceae, Ascomycetes), is one of these; it is drawing the attention of the whole world and is driving research to determine methods for its artificial cultivation.<sup>4</sup>

*O. sinensis* is an entomophagous flask species that feeds on the larvae of ghost moths (*Thitarodes* spp.) and produces a fruiting body that emerges from

the head of the larvae in the spring or early summer of the following year. The dispersed fungal spores attach themselves to the body of the insect host excrete enzymes that eventually dissolve the exoskeleton at the point of attachment, as reported for *O. unilateralis*.<sup>5</sup> The body of the insect host is used by the fungus as a substrate to form the mycelium, which is finally converted into a sclerotium (a compact mass of mycelia), leaving the exoskeleton intact. The Tibetan name for *O. sinensis* is *Yartsa Gunbu* (dbyar rtswa dgun bu), meaning “summer grass, winter worm.” The Chinese call this fungus *Dong Chong Xia Cao*<sup>6</sup>; it is popularly known as *Yartsa Gumba* in the eastern Himalayan region, *Keera Jhar* in the western Himalayan region, *Totsi Kasu* or *Tochukasu* in Japanese, and *Yartsa Guenboob* in Dzongkha.<sup>7</sup> In early English<sup>8</sup> it was known as *Hia Tsao Tong Tchong* and *Hea Tsaon Tsong Chung*; at present, it is commonly called the Chinese caterpillar mushroom.

The species is endemic to the high Himalaya Mountains of the Tibet Autonomous Region of China (specifically the Tibetan Plateau administered by the